



NEWS RELEASE

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LABORATORY BUILDS NEW COATING FACILITY

KIRTLAND AIR FORCE BASE, N.M. – Construction on a new mirror-coating facility is nearing completion here at the Air Force Research Laboratory, enabling researchers to produce more durable, efficient mirrors for high-energy lasers.

Planned for completion in April, the 3,000-square-foot facility will be able to coat mirrors as large as 2.5 meters (100 inches) wide. The laboratory's current capability is limited to optics 10-12 inches in diameter.

"This lab will provide a capability to coat large optics, to meet the demand of the Air Force. By developing in-house optics, we will have the technology where we need it, and it will potentially be the center for all DOD optical coatings," said program manager Dr. David Reicher, a contractor with the laboratory's Directed Energy Directorate.

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Called “the modulated DC reactive sputtering process,” the technology planned for use in the Airborne Laser (ABL) and future optics was pioneered at the laboratory. The process uses ions excited by a voltage that collide into a target of coating material and knock off molecules, which in turn land on the mirror’s surface to form a coating. The result is films that are very pure and very hard.

The coatings produced will be one to 10 microns thick, a micron being a millionth of a meter. For comparison’s sake, the thickness of a human hair ranges from 40 to 200 microns thick.

The coatings can produce mirrors that have a better than 99.99 percent reflectivity – especially useful when dealing with very high energies, as the coatings allow the mirror to withstand the heat intensity without degraded imaging performance.

“The problems encountered with the coating process occur with the larger mirrors. Coating uniformity, to a small fraction of a wavelength, is necessary. Several optics for the ABL (mainly the conformed window) are highly curved. It (uniformity) is a real technical problem, but we feel our technology can overcome that,” said Reicher.

The construction is being financed by the Missile Defense Agency’s ABL System Program Office, which employs large optics in its laser system to target and destroy ballistic missiles.

Over the next two years following the completed construction, the chamber will be used to develop the process to coat the optics for the ABL, though Reicher hopes that ABL will not be the only customer. The planned budget for the two-year ABL effort is \$1.29 million.

Other potential customers for the facility include the Relay Mirror Experiment, a directed energy program that takes a beam of energy from a ground- air- or space-based source and redirects the energy through a series of mirrors to a target.